

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant(s)	Keung, J.K.	Examiner:	Hai Vo
Serial No.:	09/666,928	Group Art Unit:	6748
Confirmation No.:	6748	Docket:	10188
Filed:	September 21, 2000	Dated:	December 5, 2002
For:	HEAT-SEALABLE MULTI-LAYER WHITE OPAQUE FILM		

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Commissioner for Patents  
Washington, DC 20231

DECLARATION OF J.K. KEUNG UNDER 37 CFR 1.132

Sir:

I, Jay K. Keung, M.S., a co-inventor named in the above-identified U.S. patent application, declare as follows:

1. I hold an M.S. degree in Chemical Engineering from Rensselaer Polytechnic Institute.
2. I have been an employee of Mobil, now ExxonMobil, since 1981.
3. I am a co-inventor named in at least three issued United States Patents.
4. My professional expertise is in oriented polypropylene (OPP) films.

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5. I have worked with OPP films in design, processing and manufacturing for twenty years.
6. I am a co-inventor listed on U.S. Patent Application Serial No. 09/666,928 entitled "HEAT-SEALABLE MULTI-LAYER WHITE OPAQUE FILM" filed in the United States Patent and Trademark Office on September 21, 2000.
7. The three layer film disclosed in Comparative Example 1 of U.S. Patent Application Serial No. 09/666,928 is designated as WOS and was part of the prior art. The film is identical to the WOS product sold by ExxonMobil, having the following structure and composition:
  - A. a top layer of Exxon® 4612 polypropylene and 4% (w/w) Millenium RCL4 TiO<sub>2</sub> as a whitening agent, wherein this layer is about 25% of the total film thickness;
  - B. a cavitated core layer of Exxon® 4612 (a polypropylene polymer of high stereo regularity) and 8% (v/v) Ticona Celenese® 1300A polybutylene terephthalate (PBT) as cavitating agent;
  - C. a bottom layer of polypropylene of about 8% of the total film thickness;
8. The heat-sealable five-layer white opaque films claimed in U.S. Serial No. 09/666,928 are suitable for packaging heat sensitive items, including frozen novelties, such as ice cream bars and ice cream sandwiches.

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9. A critical requirement for such films is that the Minimum Seal Temperature (MST) must be low enough to allow sealing without causing deterioration of the heat sensitive product being packaged.
10. The following tests were done by me, or by persons under my direct supervision and control:
  11. An opaque, cavitated five layer film and yielding about 28,000 sq in/lb polymer (i.e. corresponding to a total polymer thickness of about 1 mil), as in Example 2 of U.S. Serial No. 09/666,928 was prepared. The film is identical to the WOS2 product sold by ExxonMobil, having the following structure and composition, as in pending claim 13:
    - A. a top skin layer of polypropylene, 0.23% (w/w) SiO<sub>2</sub> in the form of Sylabloc® 45 and 0.2% (w/w) methyl acrylate antistatic agent; wherein this layer is about 2.5% of the total film thickness;
    - B. a top tie layer of Exxon® 4612 polypropylene and 4% (w/w) Millenium RCL4 TiO<sub>2</sub> as a whitening agent, wherein this layer is about 15% of the total film thickness;
    - C. a cavitated core layer of Exxon® 4612 (a polypropylene polymer of high stereo regularity) and 8% (w/w) Ticona Celenese® 1300A polybutylene terephthalate (PBT) as cavitating agent;
    - D. a bottom tie layer of polypropylene; wherein this layer is about 15% of the total film thickness;

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E. a bottom skin layer of an ethylene-propylene-butylene (EPB) terpolymer, 0.1% (w/w) SiO<sub>2</sub> in the form of Sylabloc® 44 as antiblock agent; 0.1% (w/w) cross-linked siloxane Tospearl® T130; wherein this layer is about 4% of the total film thickness.

12. An opaque, cavitated five layer film and yielding about 28,000 sq in/lb polymer (i.e. corresponding to a total polymer thickness of about 1 mil), as in Example 3 of U.S. Serial No. 09/666,928 was prepared. The film is identical to the WOW product sold by ExxonMobil, having the following structure and composition, as pending in claim 17:

- A. a top skin layer of ethylene-polypropylenebutylene (EPB) terpolymer, 0.23% (w/w) SiO<sub>2</sub> in the form of Sylabloc® 45 and 0.2% (w/w) methyl acrylate antiblock agent; wherein this layer is about 2.5% of the total film thickness;
- B. a top tie layer of Exxon® 4612 polypropylene and 4% (w/w) Millenium RCL4 TiO<sub>2</sub> as a whitening agent, wherein this layer is about 15% of the total film thickness;
- C. a cavitated core layer of Exxon® 4612 (a polypropylene polymer of high stereo regularity) and 8% (w/w) Ticona Celenese® 1300A polybutylene terephthalate (PBT) as cavitating agent;
- D. a bottom tie layer of polypropylene; wherein this layer is about 15% of the total film thickness;

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E. a bottom skin layer of an ethylene-propylene-butylene (EPB) terpolymer, 0.1% (w/w) SiO<sub>2</sub> in the form of Sylobloc® 44 as antiblock agent; 0.1% (w/w) cross-linked siloxane Tospearl® T130; wherein this layer is about 4% of the total film thickness.

13. Exhibit 1 shows the WOS2 (White) and WOW (White) films described in paragraphs 11 and 12 were determined to have Minimum Seal Temperatures (MSTs) of 167°F and 166°F, respectively.
14. A clear, uncavitated film of the five layer construction with a total polymer thickness of about 1 mil, described in paragraph 11, but without the PBT in the core layer, was produced. This film was designated WOS2 (Clear) and its Minimum Seal Temperature (MST) was measured. Exhibit 1 shows the MST of the WOS2 (Clear) film was 184°F.
15. A clear, uncavitated film of the five layer construction with a total polymer thickness of about 1 mil, described in paragraph 12, but without the PBT in the core layer, was produced. This film was designated WOW (Clear) and its Minimum Seal Temperature (MST) was measured. Exhibit 1 shows the MST of the WOW (Clear) film was measured as 181°F.
16. A clear, uncavitated film of the three layer construction with a total polymer thickness of about 1 mil, described in paragraph 15, but without the PBT in the

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core layer, was produced. This film was designated WOS (Clear) and its Minimum Seal Temperature (MST) was measured. Exhibit 1 shows the MST of the WOS (Clear) film was 196°F.

17. The Minimum Seal Temperatures (MSTs) of the white, opaque WOS2 (MST=167°F) and WOW (MST=166°F) films, as claimed in pending claims 13 and 17, respectively, of U.S. Serial No. 09/666,928 are substantially lower than the MSTs of the prior art films, including the white, opaque WOS film (MST=192°F ) of the prior art.
18. The substantially lower MSTs of the white, opaque WOS2 (MST=167°F) and WOW (MST=166°F) films, as claimed in pending claims 13 and 17, respectively, of U.S. Serial No. 09/666,928 are shown to be due in large part to presence of the polybutylene terephthalate (PBT) cavitating agent in the core layer. Compare the MSTs of the uncavitated and the PBT-containing, cavitated WOS2 and WOW films - designated "Clear" WOS2 (MST=184°F) and WOW (MST=181°F) and the "White" WOS2 (MST=167°F) and WOW (MST=166°F) films, respectively, in the table shown in Exhibit 1.
19. The substantially lower MSTs of the white, opaque WOS2 and WOW films, as claimed in pending claims 13 and 17 of U.S. Serial No. 09/666,928, make these films more suitable for packaging and labeling heat sensitive products than the

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previously available films of the prior art, such as the WOS films described in paragraphs 7 and 16.

20. In my professional opinion, the substantial differences in the Minimum Seal Temperatures (MSTs) of the white, opaque WOS2 and WOW films of the invention as compared with both the white, opaque WOS films and the clear WOS films of the prior art is unexpected and surprising.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under §1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.



Jay K. Keung

Date: 12/5/2002  
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